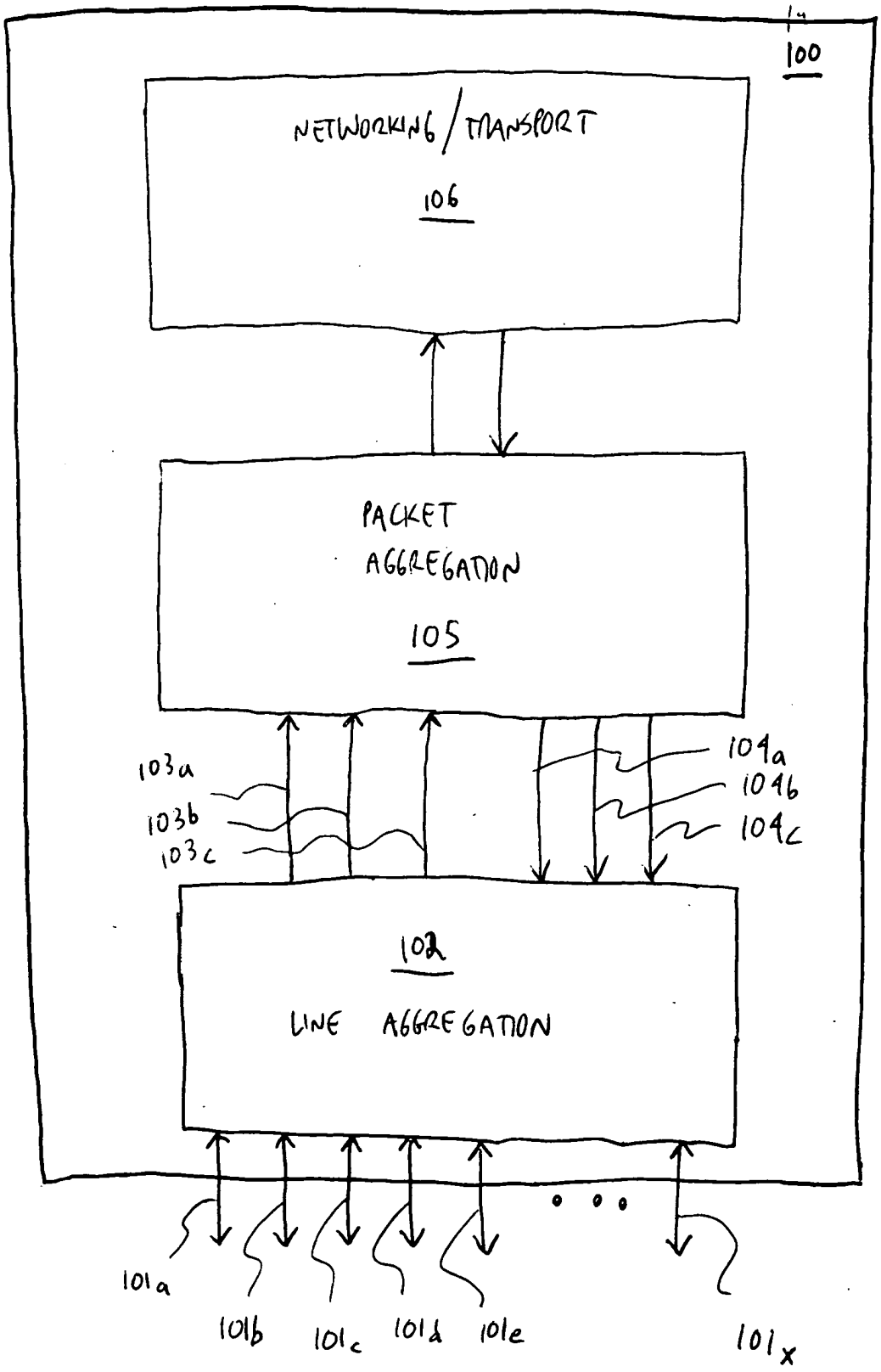


FIGURE 1 (PRIOR ART)

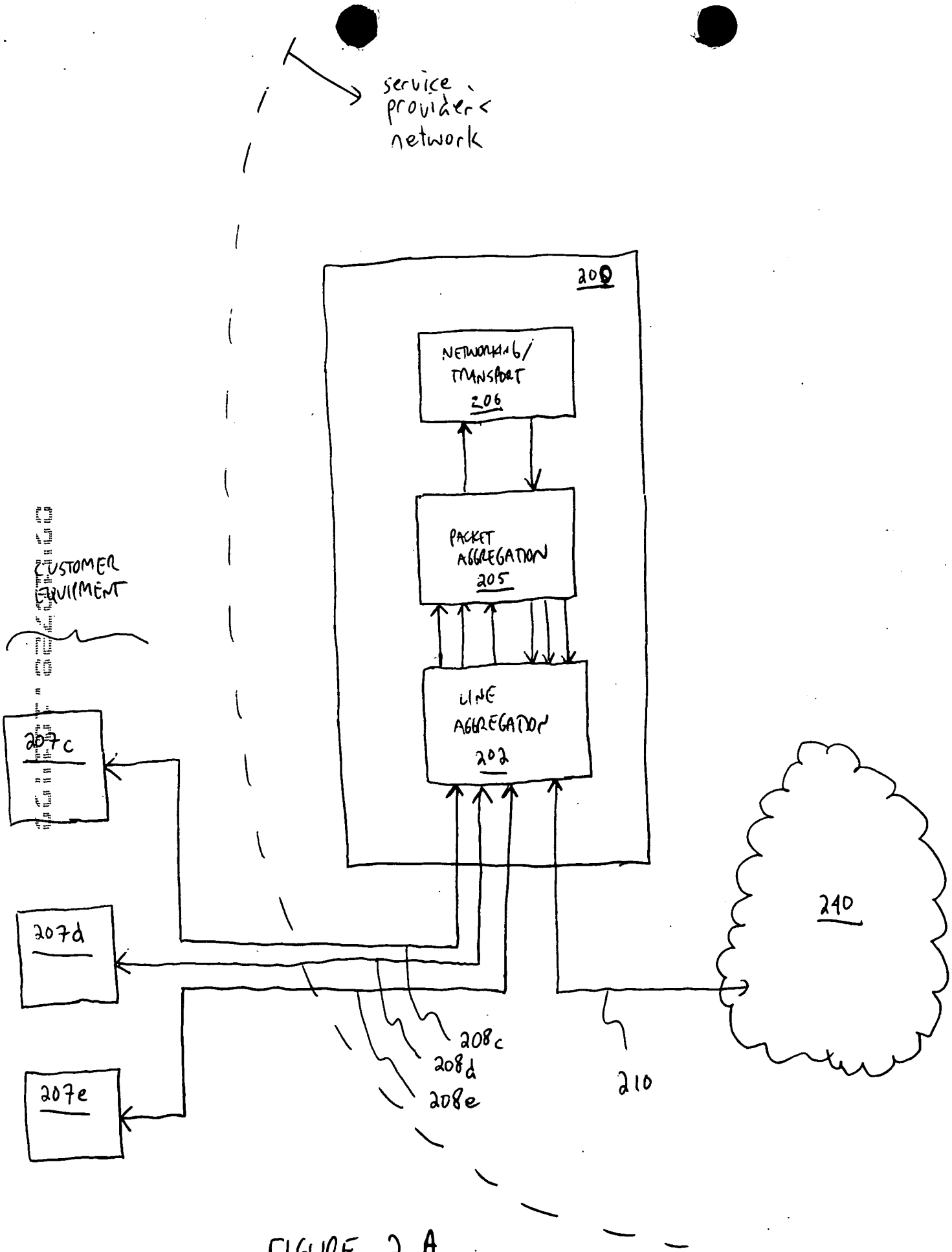

service provider network
200
NETWORK L6/ TRANSPORT 206
PACKET AGGREGATION 205
LINE AGGREGATOR 202
CUSTOMER EQUIPMENT
207c
207d
207e
208c
208d
208e
210
240

FIGURE 2A

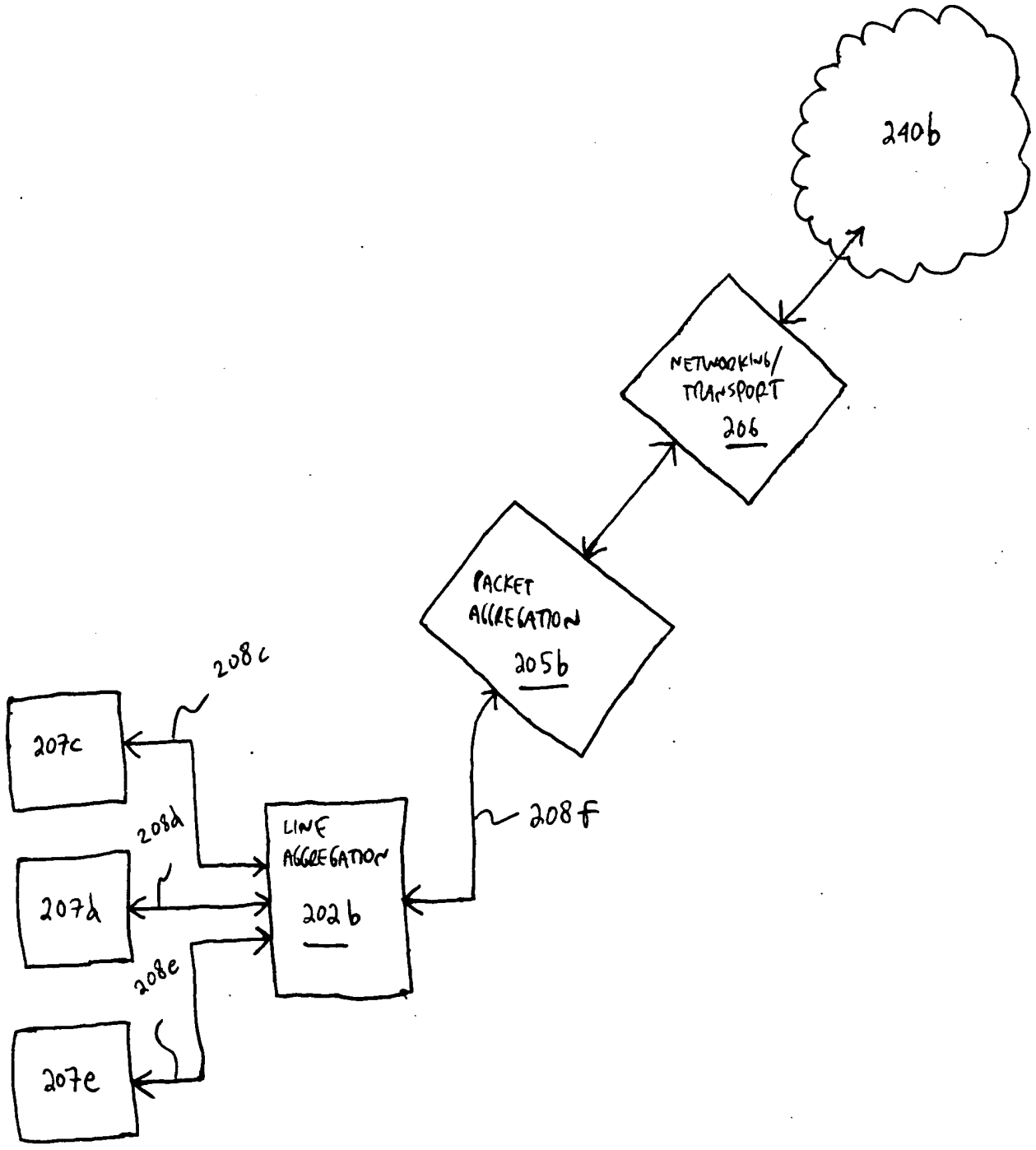

240b
NETWORKING/
TRANSPORT
206
PACKET
AGGREGATION
205b
208c
207c
208d
207d
LINE
AGGREGATION
202b
208f
208e
207e

FIGURE 2b

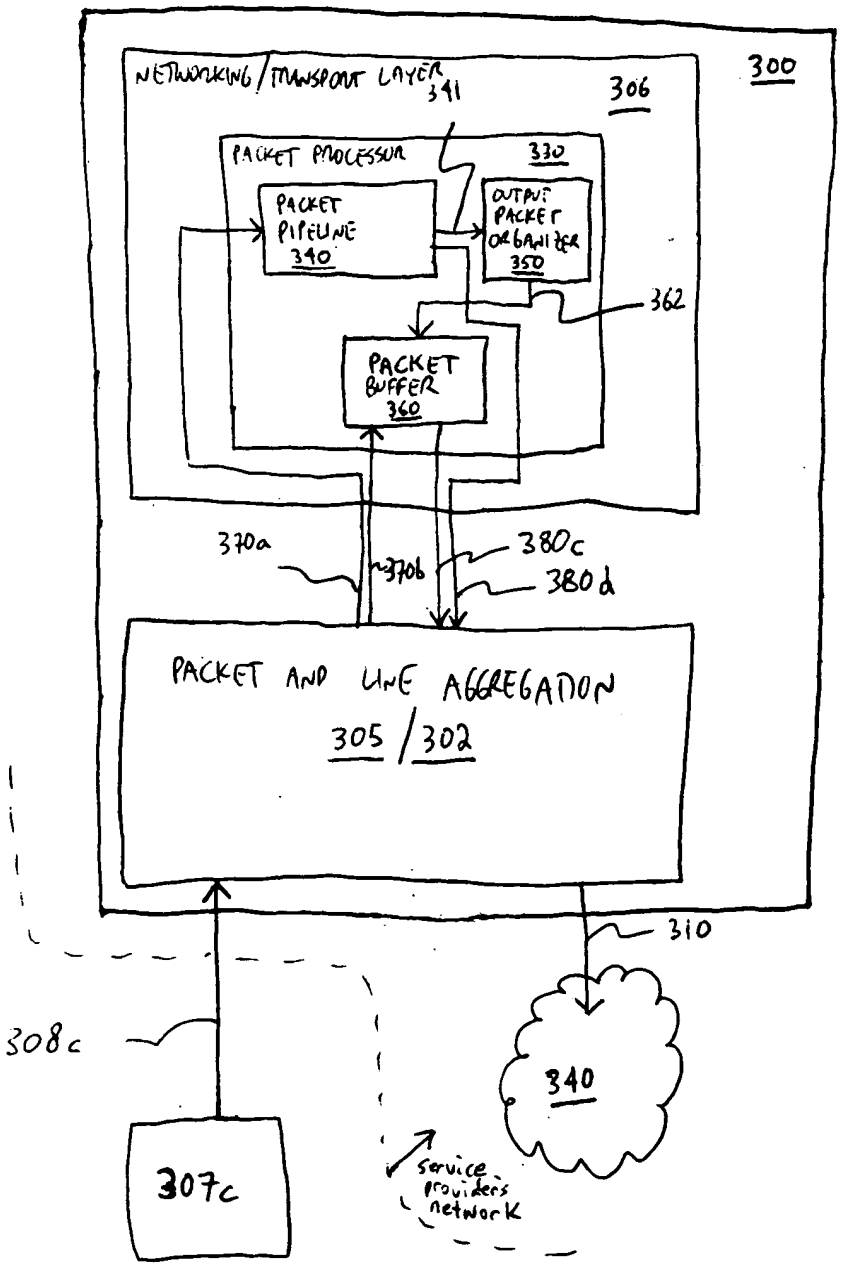

NETWORKING/TRANSPORT LAYER
341
306
300
PACKET PROCESSOR
330
PACKET PIPELINE
340
OUTPUT PACKET ORGANIZER
350
362
PACKET BUFFER
360
370a
370b
380c
380d
PACKET AND LINE AGGREGATION
305/302
310
308c
340
307c
service providers network

FIGURE 3A

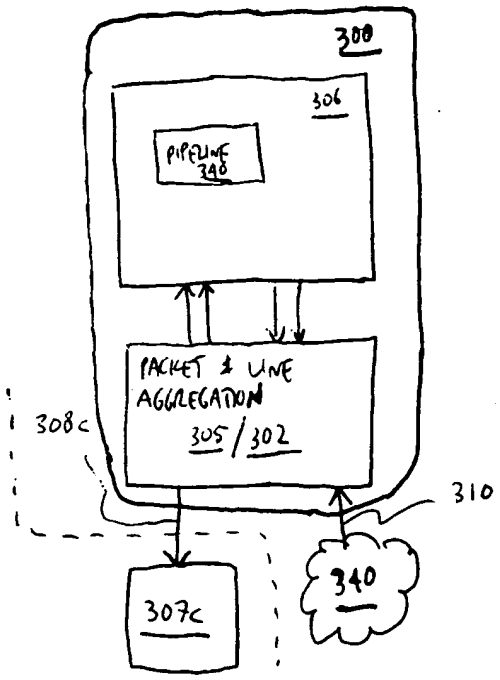


FIGURE 3B

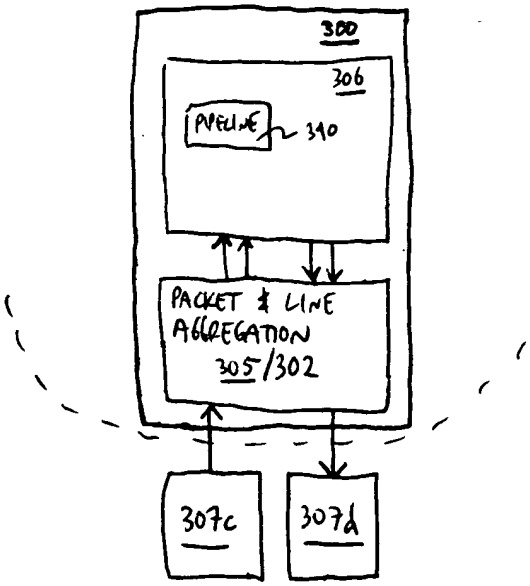
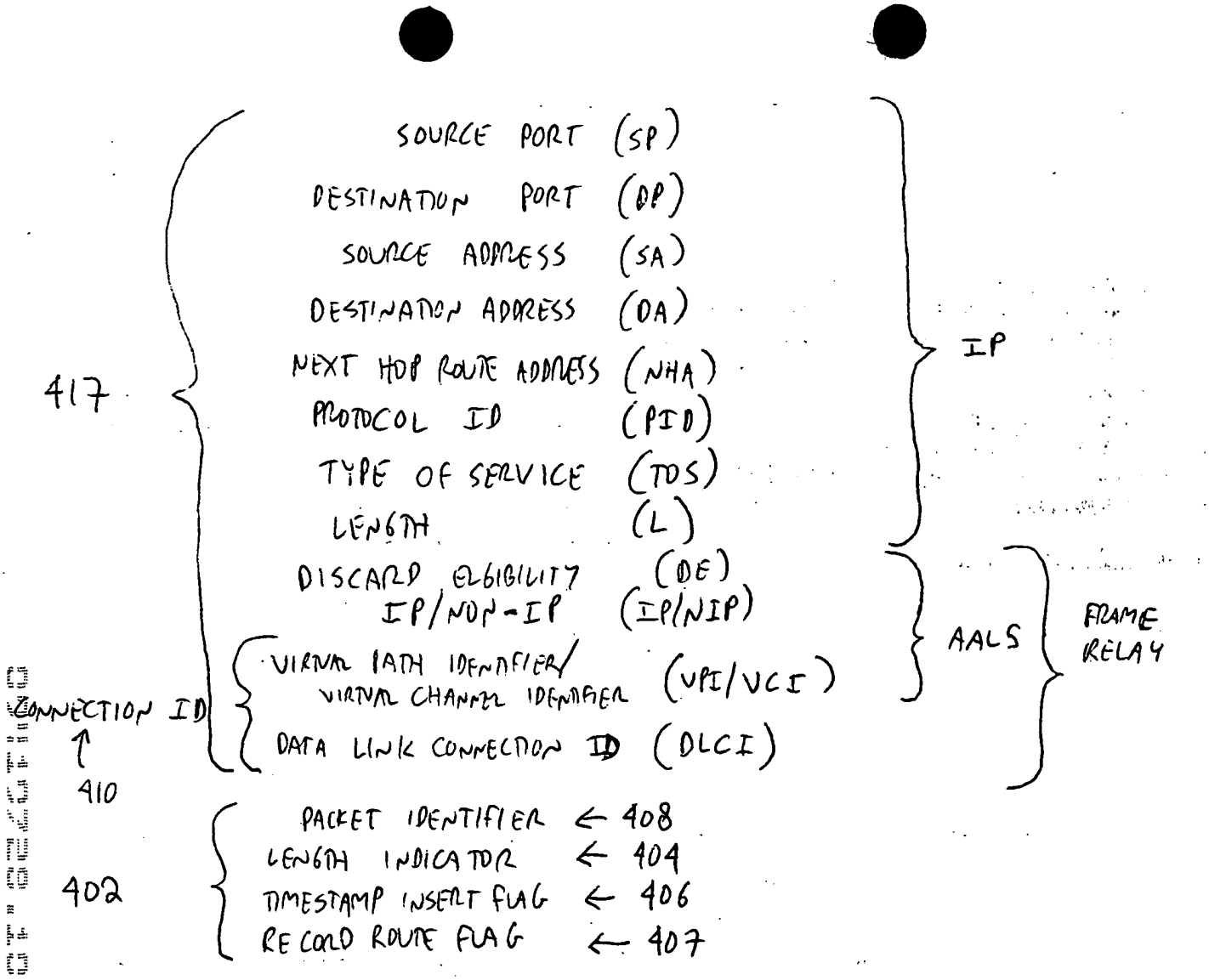


FIGURE 3C


SOURCE PORT (SP)
DESTINATION PORT (DP)
SOURCE ADDRESS (SA)
DESTINATION ADDRESS (DA)
NEXT HOP ROUTE ADDRESS (NHA)
PROTOCOL ID (PID)
TYPE OF SERVICE (TOS)
LENGTH (L)
IP
417
DISCARD ELGIBILITY (DE)
IP/NON-IP (IP/NIP)
AALS
FRAME RELAY
VIRTUAL PATH IDENTIFIER/
VIRTUAL CHANNEL IDENTIFIER (VPI/VCI)
CONNECTION ID
DATA LINK CONNECTION ID (DLCI)
410
PACKET IDENTIFIER ← 408
LENGTH INDICATOR ← 404
402
TIMESTAMP INSERT FLAG ← 406
RECORD ROUTE FLAG ← 407

495

FIGURE 4

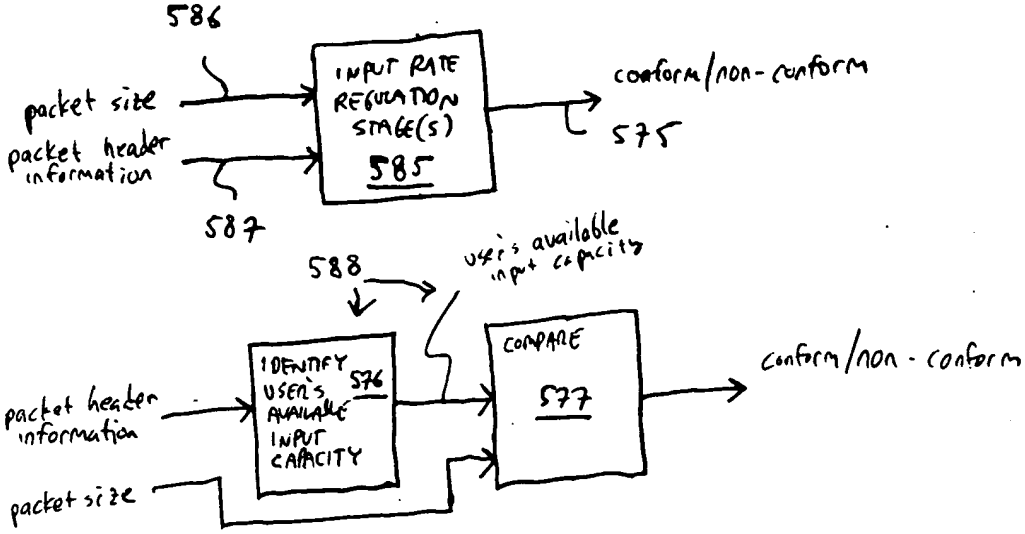


FIG. 5A

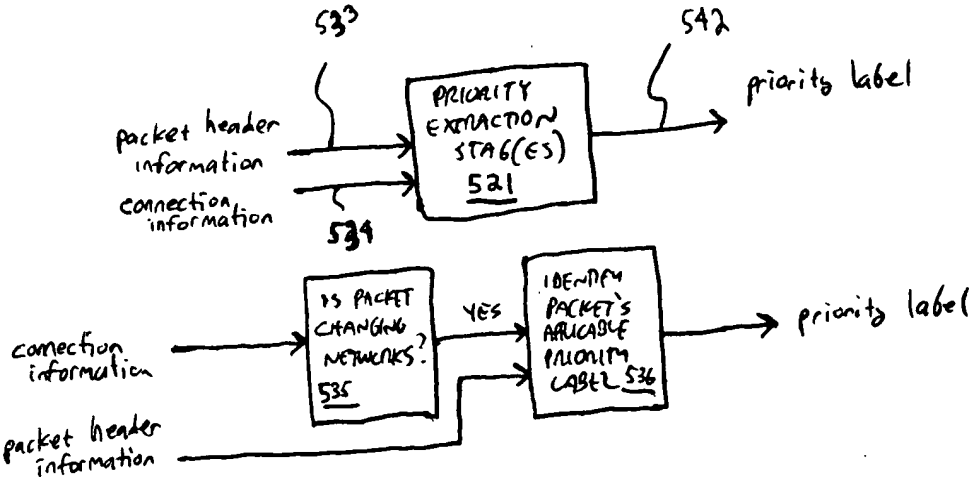


FIG. 5B

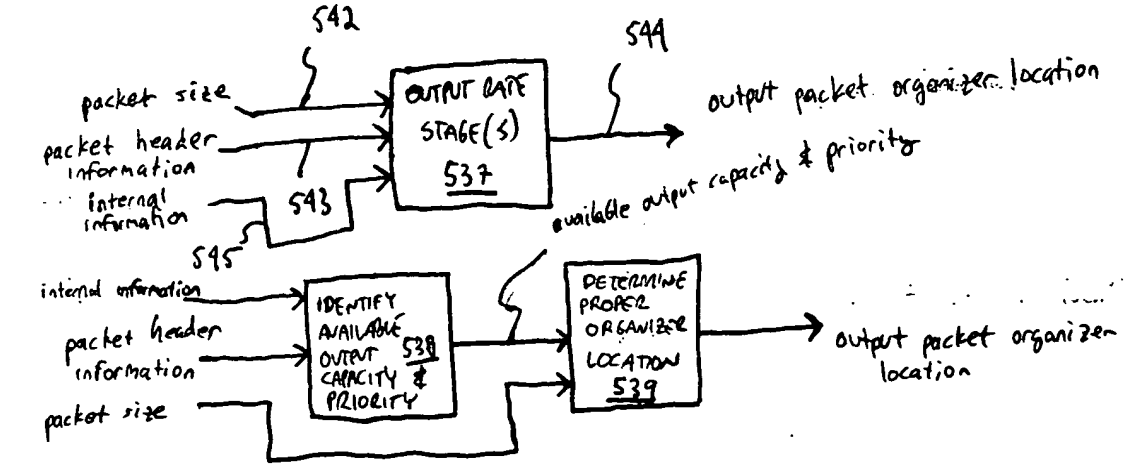


FIG. 5C

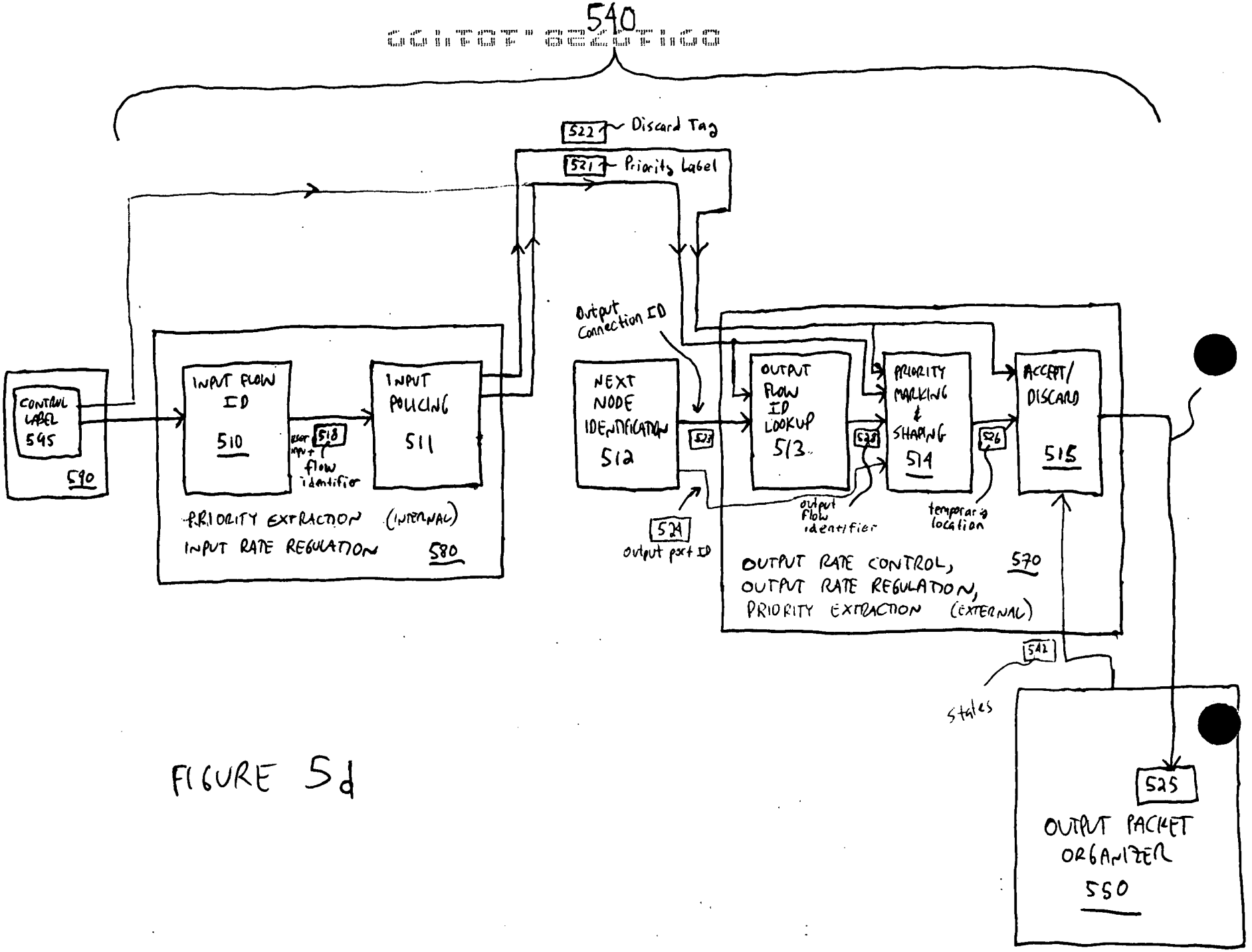

540
522
Discard Tag
521
Priority Label
CONTROL LABEL 595
590
INPUT FLOW ID 510
518
user input flow identifier
INPUT POLICING 511
PRIORITY EXTRACTION (INTERNAL)
INPUT RATE REGULATION 580
Output Connection ID
NEXT NODE IDENTIFICATION 512
524
output port ID
OUTPUT FLOW ID LOOKUP 513
528
output flow identifier
PRIORITY MARKING & SHAPING 514
526
temporary location
ACCEPT/ DISCARD 515
OUTPUT RATE CONTROL, 570
OUTPUT RATE REGULATION,
PRIORITY EXTRACTION (EXTERNAL)
542
states
525
OUTPUT PACKET ORGANIZER 550

FIGURE 5d

	INPUT FLOW ID STAGE	INPUT POLICING STAGE	NEXT NODE IDENTIFICATION STAGE	OUTPUT FLOW ID STAGE	PRIORITY MARKING AND SHAPING STAGE	ACCEPT/DISCARD STAGE
FIG. 6A	X	X	X		X	X
FIG. 6B			X	X	X	X
FIG. 6C	X	X	X	X	X	X
FIG. 6D			X		X	X

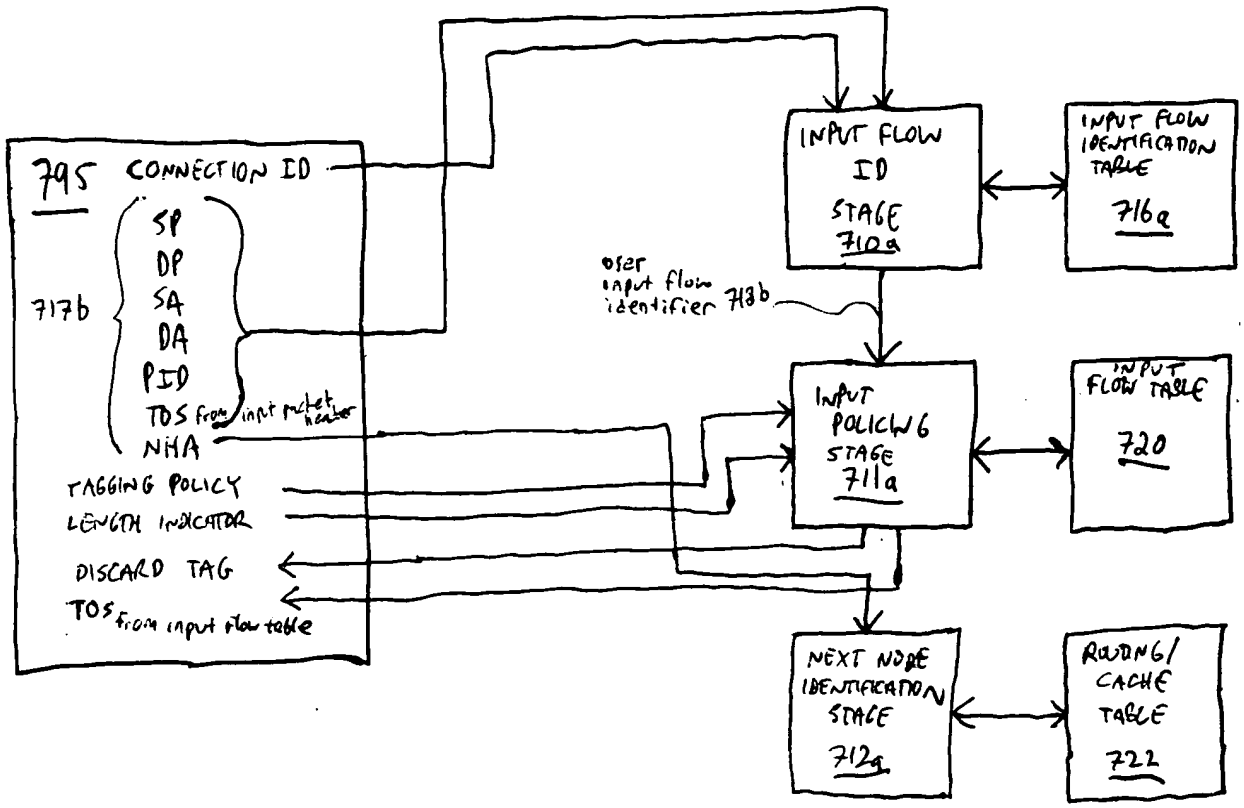

795
CONNECTION ID
717b
SP
DP
SA
DA
PID
TOS from input packet header
NHA
TAGGING POLICY
LENGTH INDICATOR
DISCARD TAG
TOS from input flow table
INPUT FLOW ID STAGE 710a
INPUT FLOW IDENTIFICATION TABLE 716a
user input flow identifier 718b
INPUT POLICING STAGE 711a
INPUT FLOW TABLE 720
NEXT NODE IDENTIFICATION STAGE 712a
ROUTING/ CACHE TABLE 722

FIGURE 7A

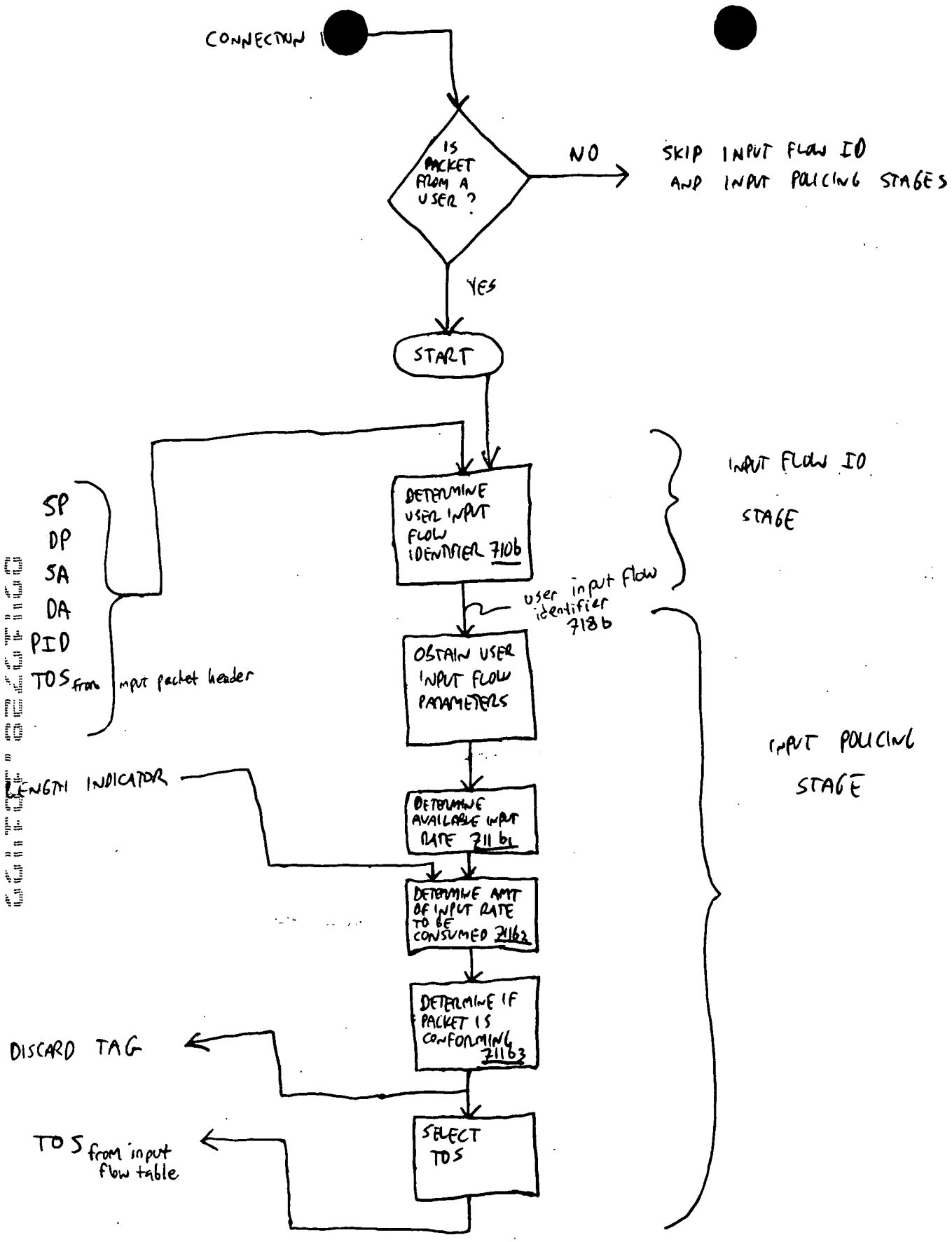

CONNECTION
IS PACKET FROM A USER ?
NO
SKIP INPUT FLOW ID AND INPUT POLICING STAGES
YES
START
DETERMINE USER INPUT FLOW IDENTIFIER 710b
INPUT FLOW ID STAGE
SP
DP
SA
DA
PID
TOS from input packet header
user input flow identifier 718b
OBTAIN USER INPUT FLOW PARAMETERS
INPUT POLICING STAGE
LENGTH INDICATOR
DETERMINE AVAILABLE INPUT RATE 711b1
DETERMINE AMT OF INPUT RATE TO BE CONSUMED 711b2
DETERMINE IF PACKET IS CONFORMING 711b3
DISCARD TAG
SELECT TOS
TOS from input flow table

FIGURE 7B

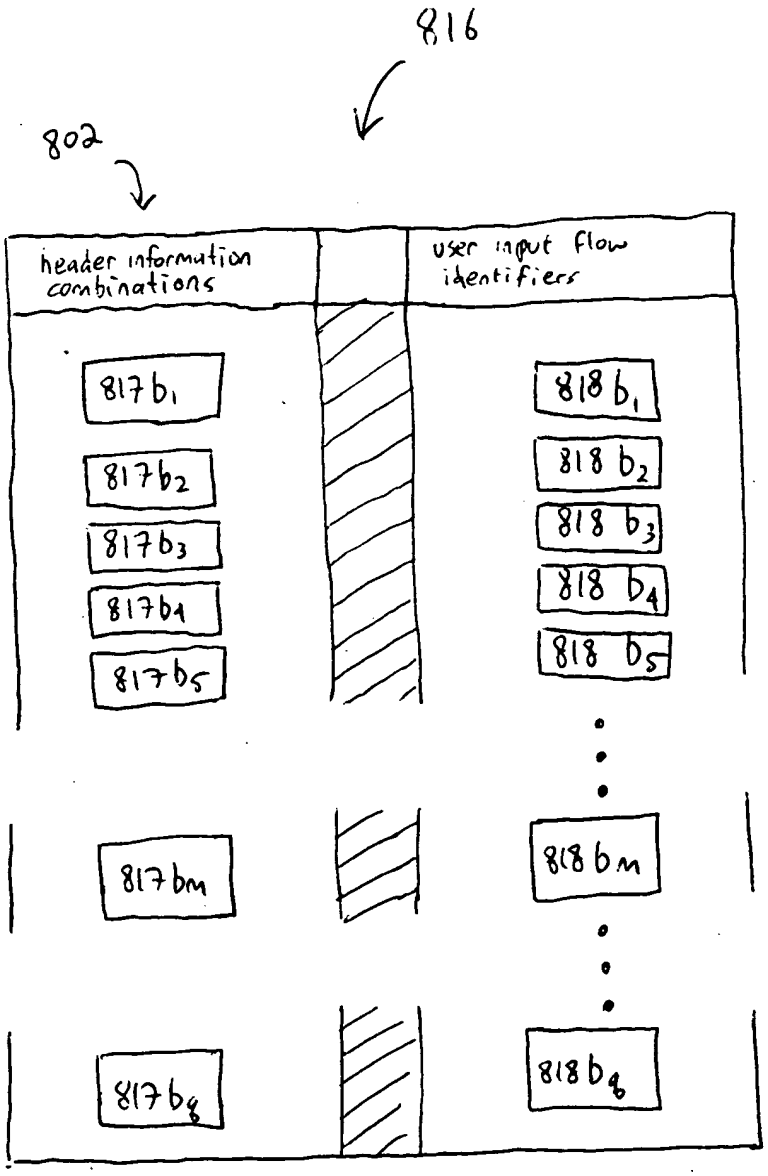
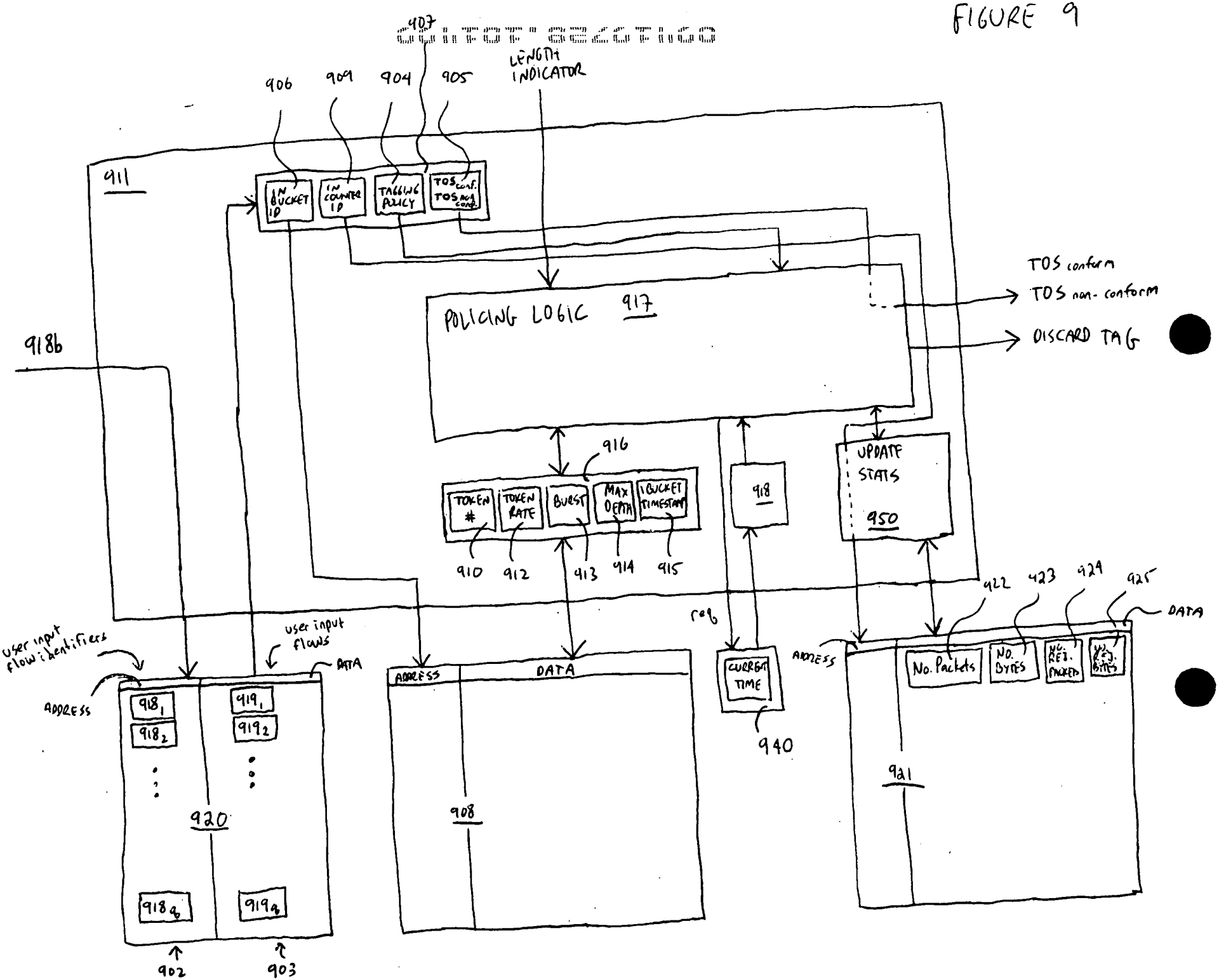

816
802
header information combinations
user input flow identifiers
817b1
817b2
817b3
817b4
817b5
817bm
817bq
818b1
818b2
818b3
818b4
818b5
818bm
818bq

FIGURE 8

FIGURE 9


907
LENGTH INDICATOR
906
909
904
905
911
IN BUCKET ID
IN COUNTER ID
TAGGING POLICY
TOS conf. TOS non conf.
POLICING LOGIC 917
TOS conform
TOS non-conform
DISCARD TAG
918b
916
TOKEN #
TOKEN RATE
BURST
MAX DEPTH
BUCKET TIMESTAMP
910
912
913
914
915
918
UPDATE STATS 950
req
922
923
924
925
DATA
user input flow identifiers
user input flows
DATA
ADDRESS
ADDRESS
DATA
CURRENT TIME
940
No. Packets
NO. BYTES
NO. REJ. PACKETS
NO. REJ. BYTES
918_1
918_2
918_q
919_1
919_2
919_q
920
908
921
902
903

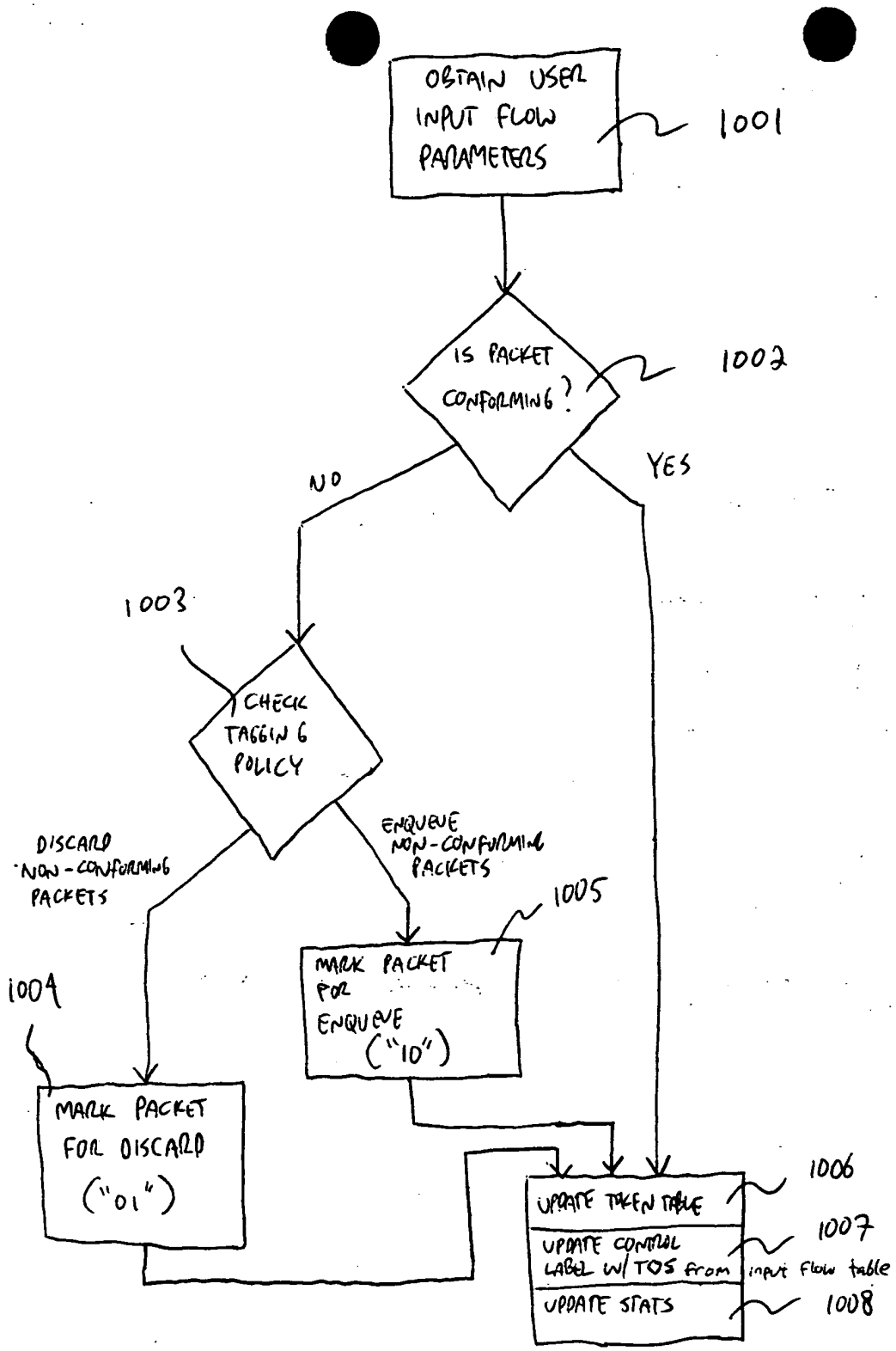
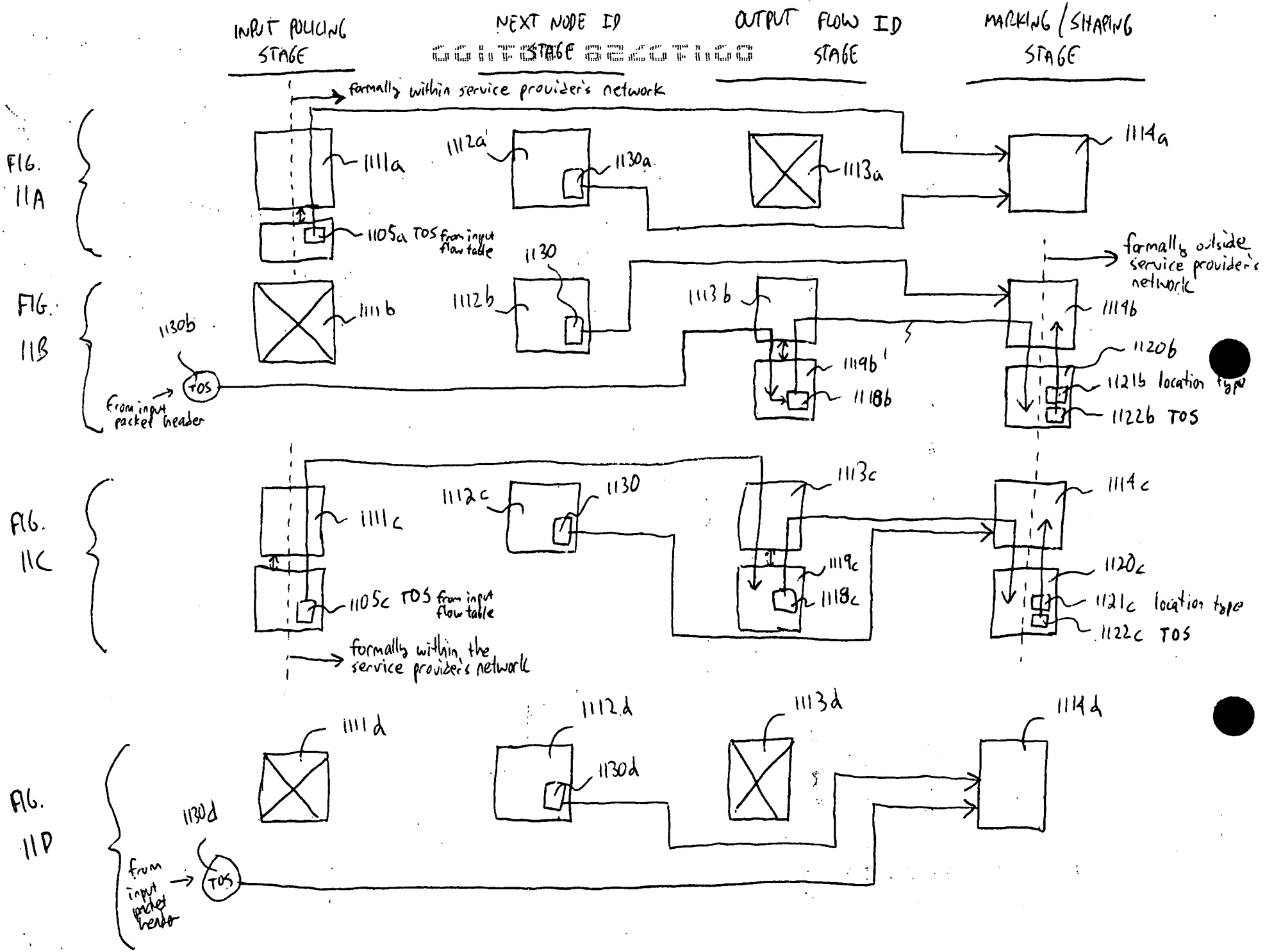

OBTAIN USER INPUT FLOW PARAMETERS
1001
IS PACKET CONFORMING?
1002
NO
YES
1003
CHECK TAGGING POLICY
DISCARD NON-CONFORMING PACKETS
ENQUEUE NON-CONFORMING PACKETS
1004
1005
MARK PACKET FOR DISCARD ("01")
MARK PACKET FOR ENQUEUE ("10")
1006
UPDATE TOKEN TABLE
1007
UPDATE CONTROL LABEL W/ TOS from input flow table
UPDATE STATS
1008

FIGURE 10


INPUT POLICING STAGE
NEXT NODE ID SELECTION STAGE
OUTPUT FLOW ID STAGE
MARKING / SHAPING STAGE
formally within service provider's network
1111a
1112a
1130a
1113a
1114a
1105a TOS from input flow table
FIG. 11A
1130
1111b
1112b
1113b
formally outside service provider's network
1114b
1120b
1121b location type
1122b TOS
1119b
1118b
1130b
TOS
From input packet header
FIG. 11B
1111c
1112c
1130
1113c
1114c
1119c
1118c
1120c
1121c location type
1122c TOS
1105c TOS from input flow table
formally within the service provider's network
FIG. 11C
1111d
1112d
1113d
1114d
1130d
TOS
From input packet header
FIG. 11D

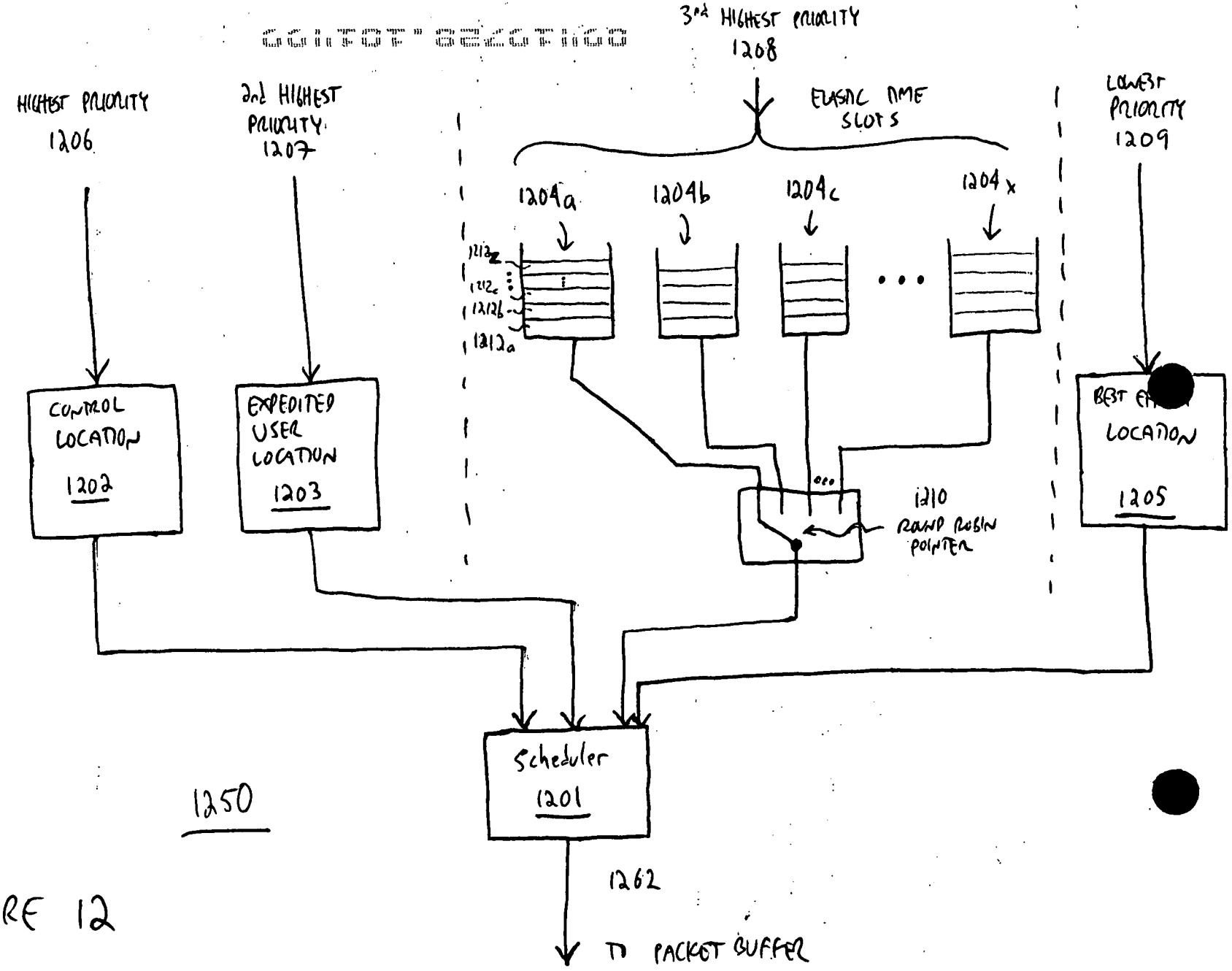

HIGHEST PRIORITY
1206
2nd HIGHEST PRIORITY
1207
3rd HIGHEST PRIORITY
1208
ELASTIC TIME SLOTS
LOWEST PRIORITY
1209
1204a
1204b
1204c
1204x
1212z
1212c
1212b
1212a
CONTROL LOCATION
1202
EXPEDITED USER LOCATION
1203
BEST EFFORT LOCATION
1205
1210
RAND ROBIN POINTER
Scheduler
1201
1250
1262
TO PACKET BUFFER

FIGURE 12

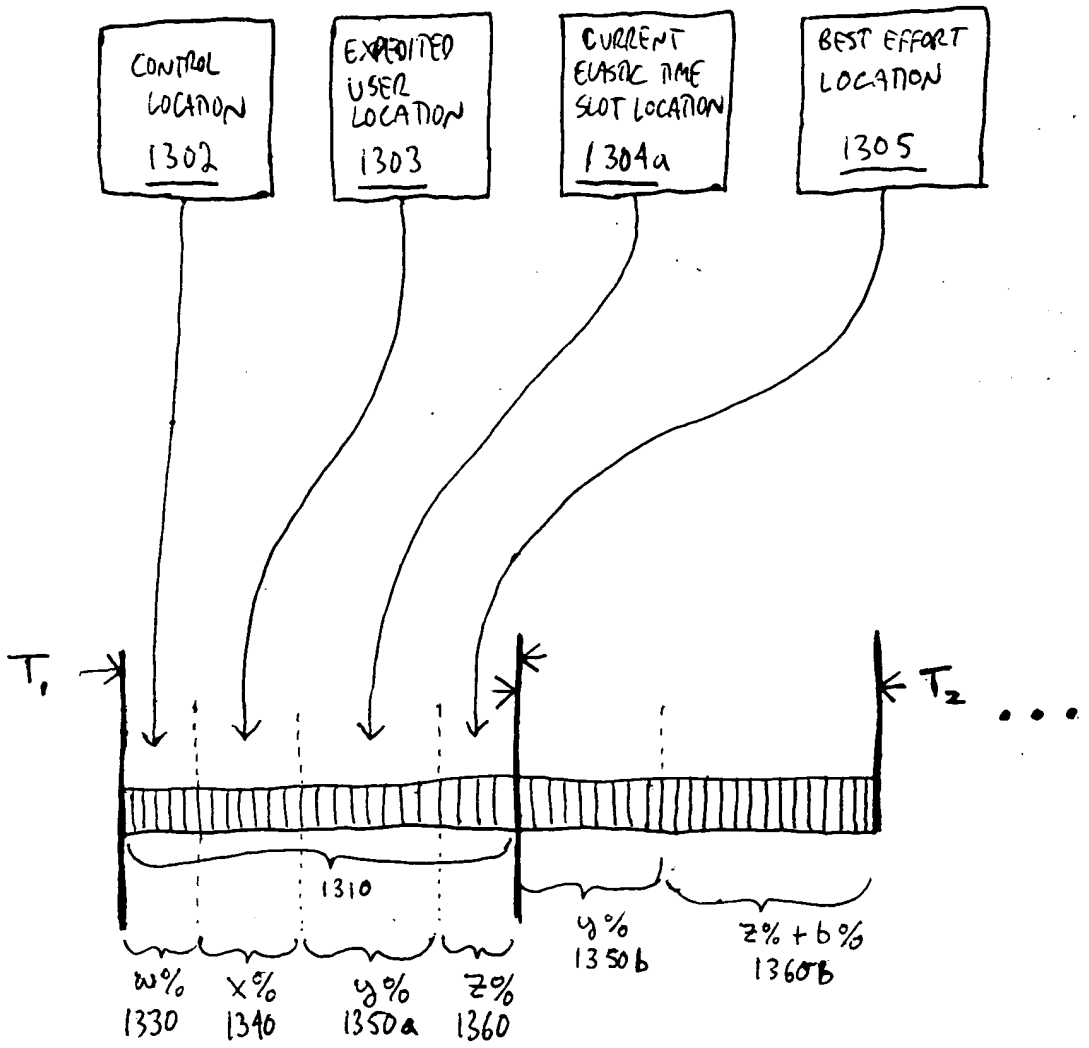

CONTROL LOCATION
1302
EXPEDITED USER LOCATION
1303
CURRENT ELASTIC TIME SLOT LOCATION
1304a
BEST EFFORT LOCATION
1305
T1
T2
1310
w%
1330
x%
1340
y%
1350a
z%
1360
y%
1350b
z% + b%
1360b

FIGURE 13

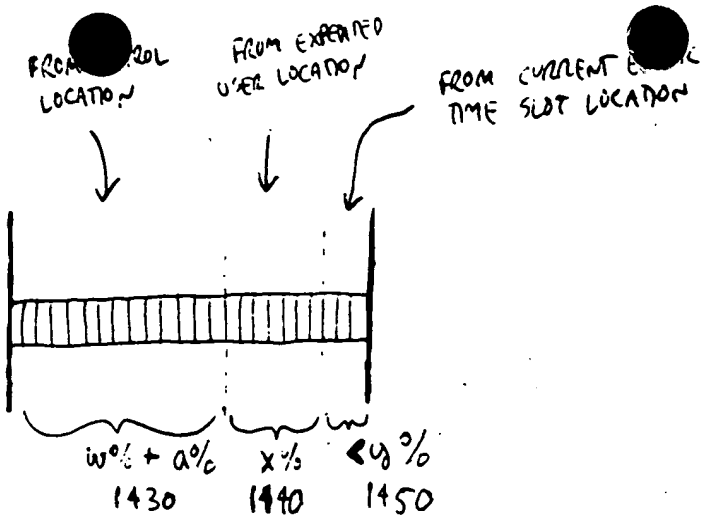


FIG. 14a

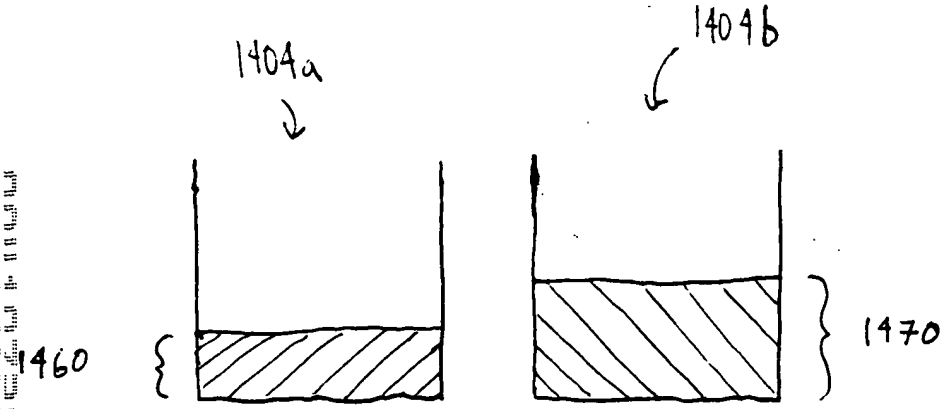


FIG. 14b

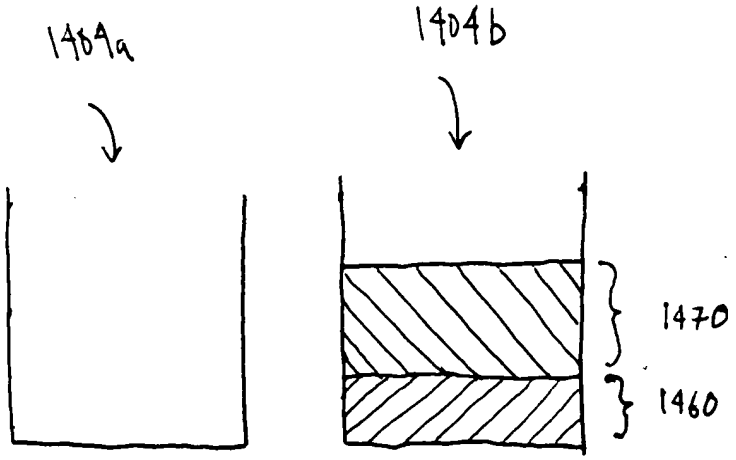


FIG. 14c

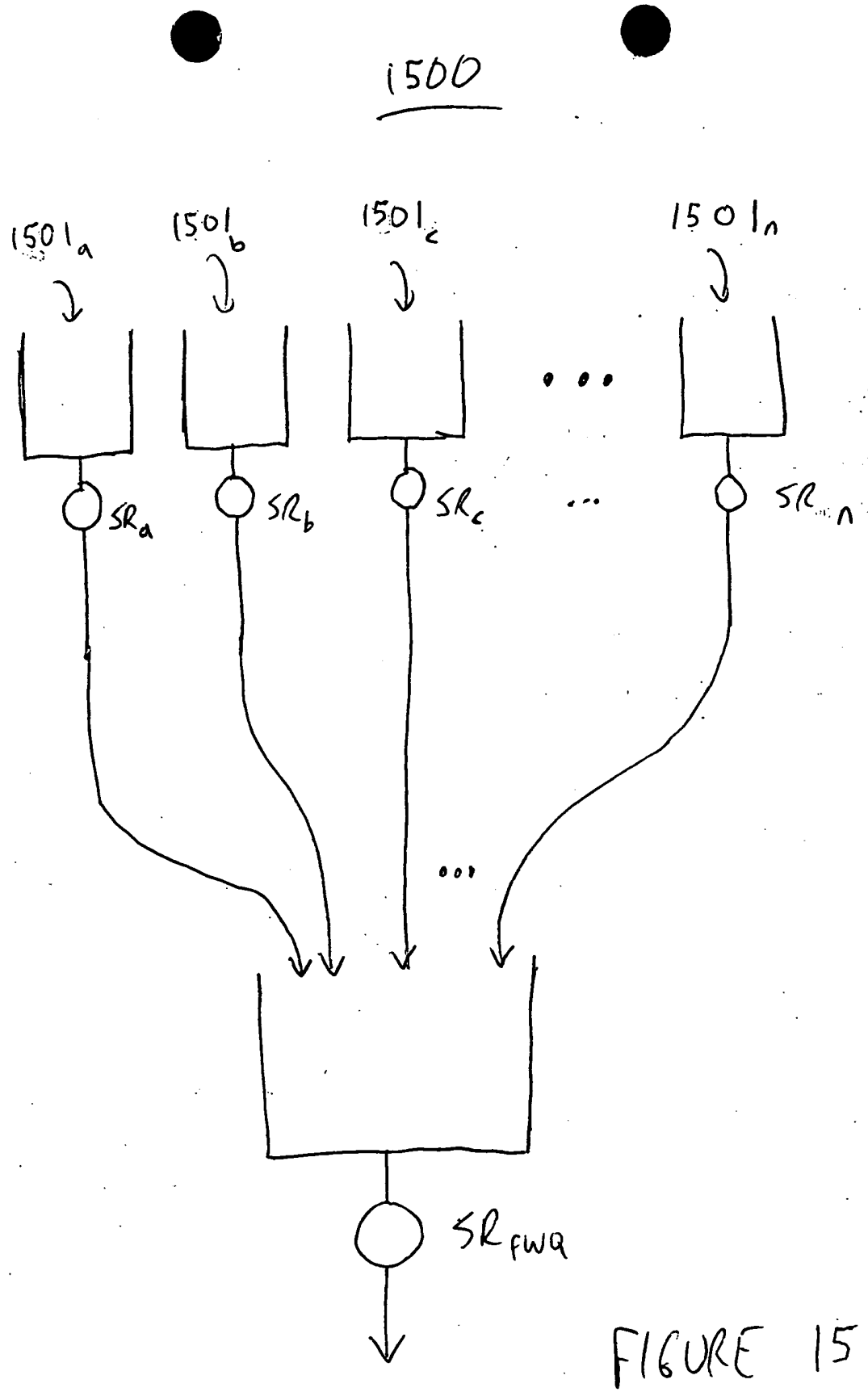


FIGURE 15

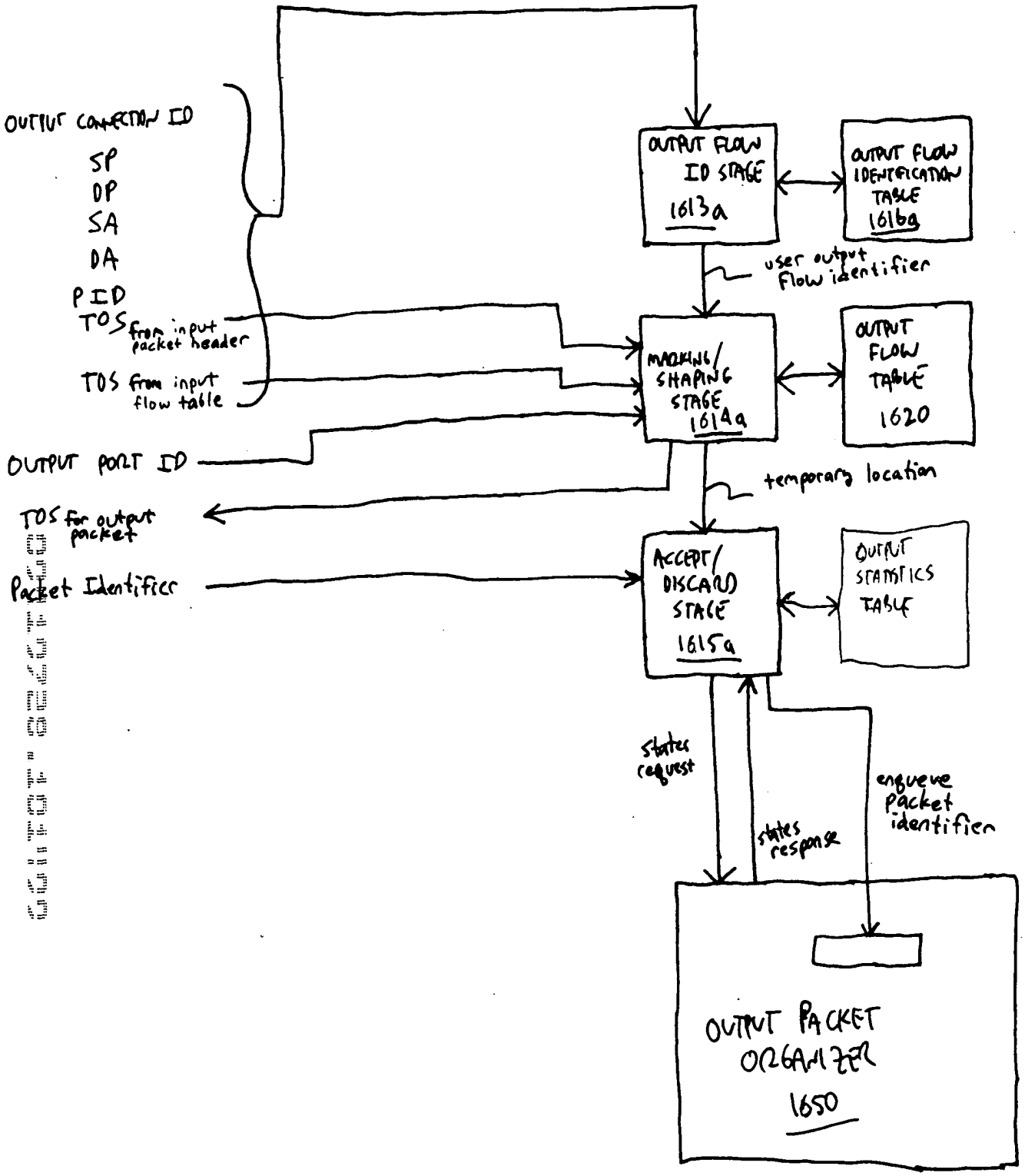

OUTPUT CONNECTION ID
SP
DP
SA
DA
PID
TOS from input packet header
TOS from input flow table
OUTPUT PORT ID
TOS for output packet
Packet Identifier
OUTPUT FLOW ID STAGE
1613a
OUTPUT FLOW IDENTIFICATION TABLE
1616a
user output Flow identifier
MARKING/ SHAPING STAGE
1614a
OUTPUT FLOW TABLE
1620
temporary location
ACCEPT/ DISCARD STAGE
1615a
OUTPUT STATISTICS TABLE
states request
states response
enqueue packet identifier
OUTPUT PACKET ORGANIZER
1650

FIGURE 16a

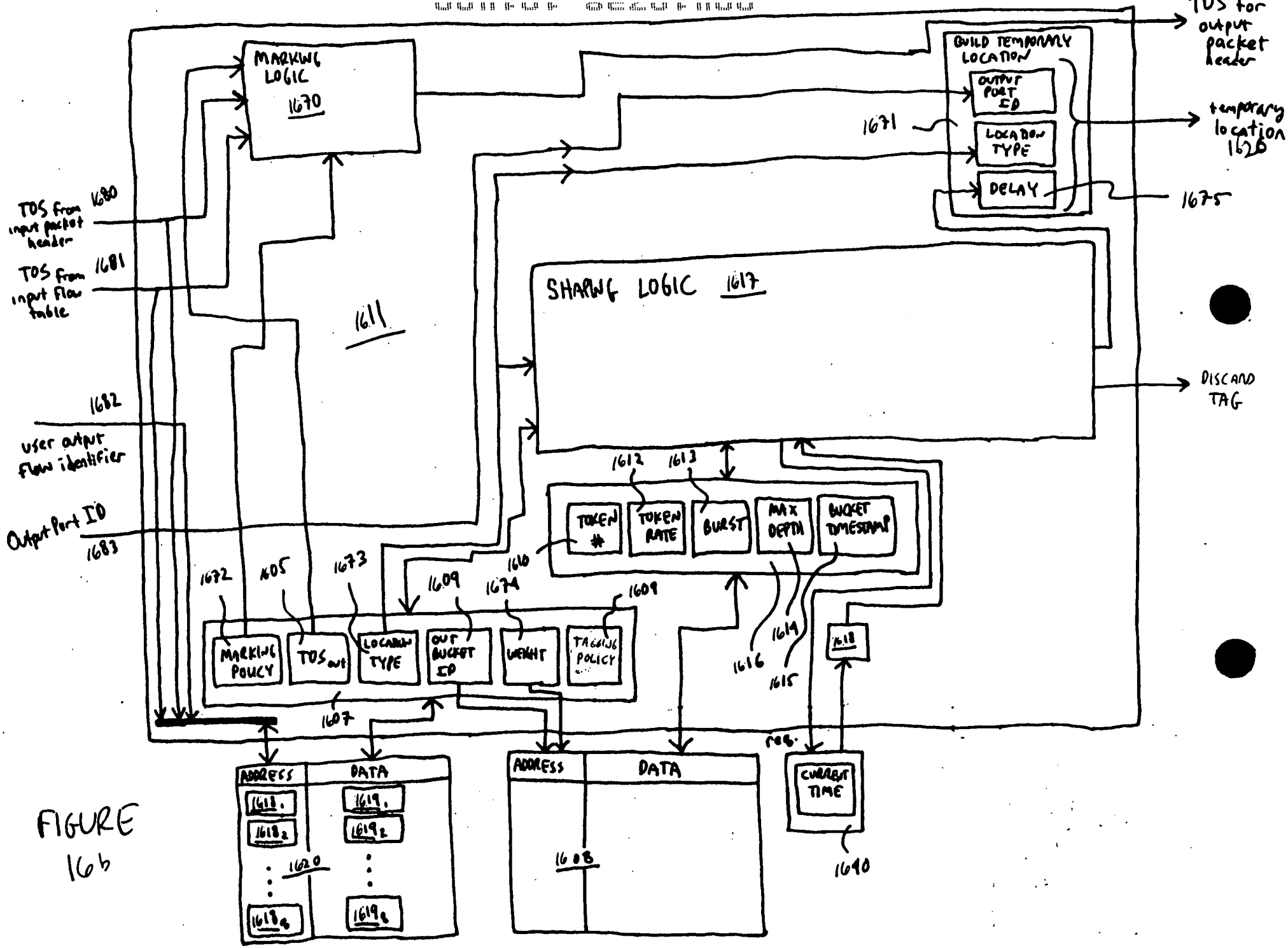

MARKING LOGIC 1670
BUILD TEMPORARY LOCATION
OUTPUT PORT ID
LOCATION TYPE
DELAY
1671
TOS for output packet header
temporary location 1620
1675
TOS from input packet header 1680
TOS from input flow table 1681
1611
SHAPING LOGIC 1617
DISCARD TAG
1682
user output flow identifier
Output Port ID 1683
1612
1613
TOKEN #
TOKEN RATE
BURST
MAX DEPTH
BUCKET TIMESTAMP
1610
1672
1605
1673
1609
1674
1609
MARKING POLICY
TOS out
LOCATION TYPE
OUT BUCKET ID
WEIGHT
TAGGING POLICY
1616
1619
1615
1618
1607
ADDRESS
DATA
1618 1
1618 2
1618 n
1619 1
1619 2
1619 n
1620
ADDRESS
DATA
1608
reg.
CURRENT TIME
1690

FIGURE 16b

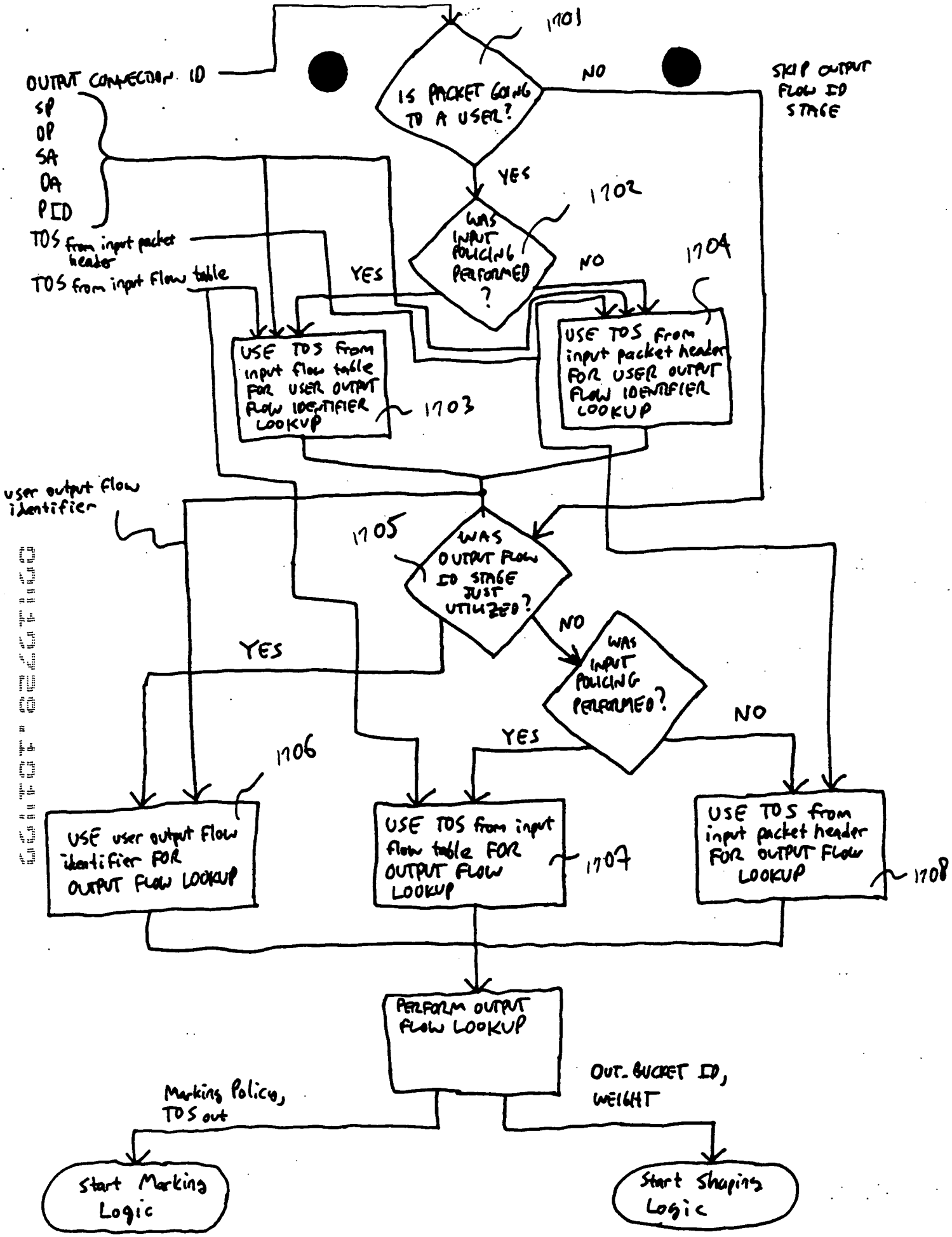

1701
IS PACKET GOING TO A USER?
NO
SKIP OUTPUT FLOW ID STAGE
YES
OUTPUT CONNECTION ID
SP
DP
SA
DA
PID
TOS from input packet header
TOS from input Flow table
1702
WAS INPUT POLICING PERFORMED ?
YES
NO
1704
USE TOS from input flow table FOR USER OUTPUT FLOW IDENTIFIER LOOKUP
1703
USE TOS from input packet header FOR USER OUTPUT FLOW IDENTIFIER LOOKUP
user output flow identifier
1705
WAS OUTPUT FLOW ID STAGE JUST UTILIZED?
YES
NO
WAS INPUT POLICING PERFORMED?
YES
NO
1706
USE user output Flow identifier FOR OUTPUT FLOW LOOKUP
USE TOS from input flow table FOR OUTPUT FLOW LOOKUP
1707
USE TOS from input packet header FOR OUTPUT FLOW LOOKUP
1708
PERFORM OUTPUT FLOW LOOKUP
Marking Policy, TOS out
OUT_BUCKET ID, WEIGHT
Start Marking Logic
Start Shaping Logic

FIGURE 17a

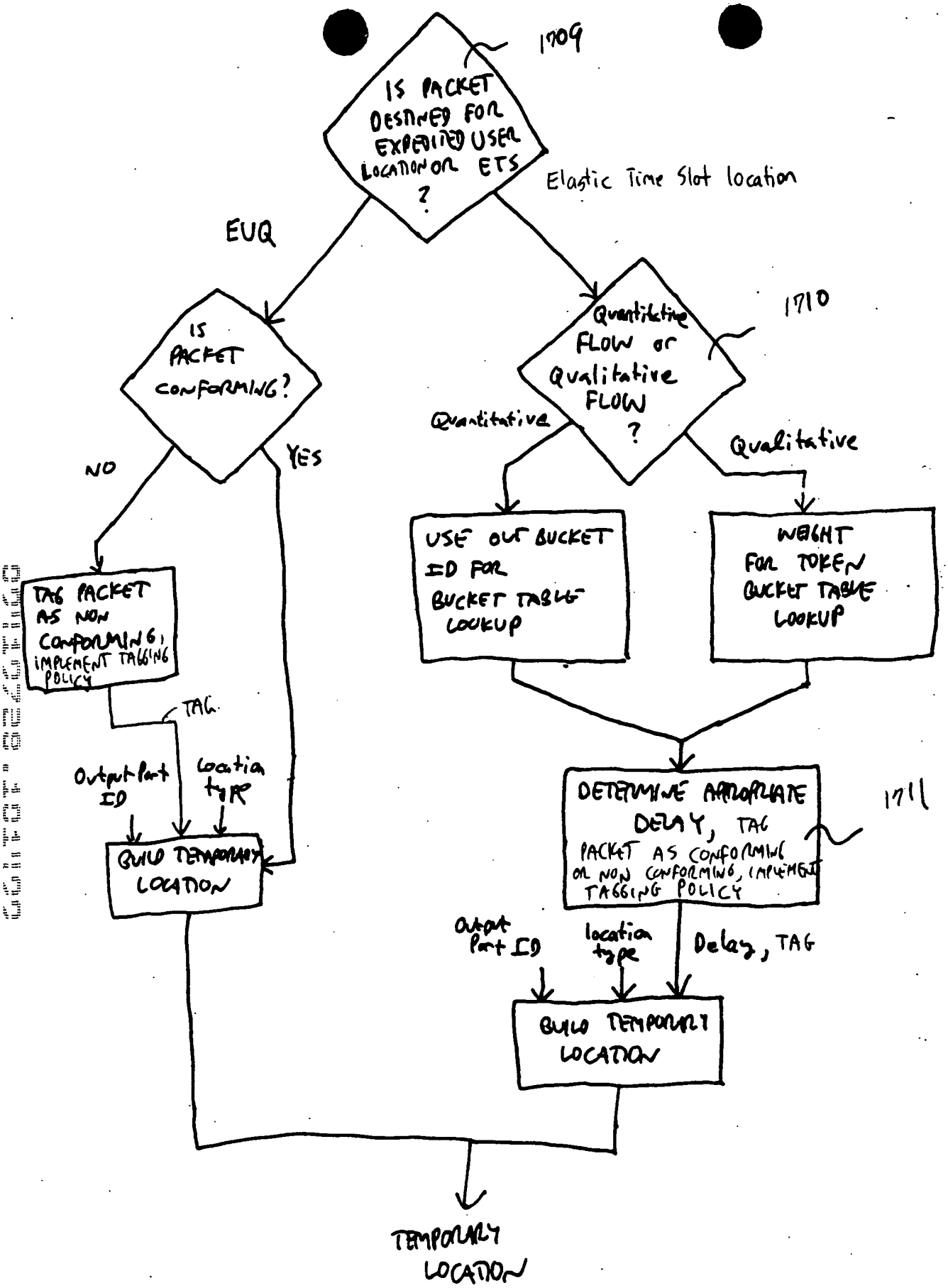

1709
IS PACKET DESTINED FOR EXPEDITED USER LOCATION OR ETS ?
Elastic Time Slot location
EUQ
IS PACKET CONFORMING?
NO
YES
1710
Quantitative FLOW or Qualitative FLOW ?
Quantitative
Qualitative
TAG PACKET AS NON CONFORMING; IMPLEMENT TAGGING POLICY
USE OUT BUCKET ID FOR BUCKET TABLE LOOKUP
WEIGHT FOR TOKEN BUCKET TABLE LOOKUP
TAG
Output Port ID
Location type
DETERMINE APPROPRIATE DELAY, TAG PACKET AS CONFORMING OR NON CONFORMING, IMPLEMENT TAGGING POLICY
1711
Output Port ID
location type
Delay, TAG
BUILD TEMPORARY LOCATION
BUILD TEMPORARY LOCATION
TEMPORARY LOCATION

FIGURE 17b

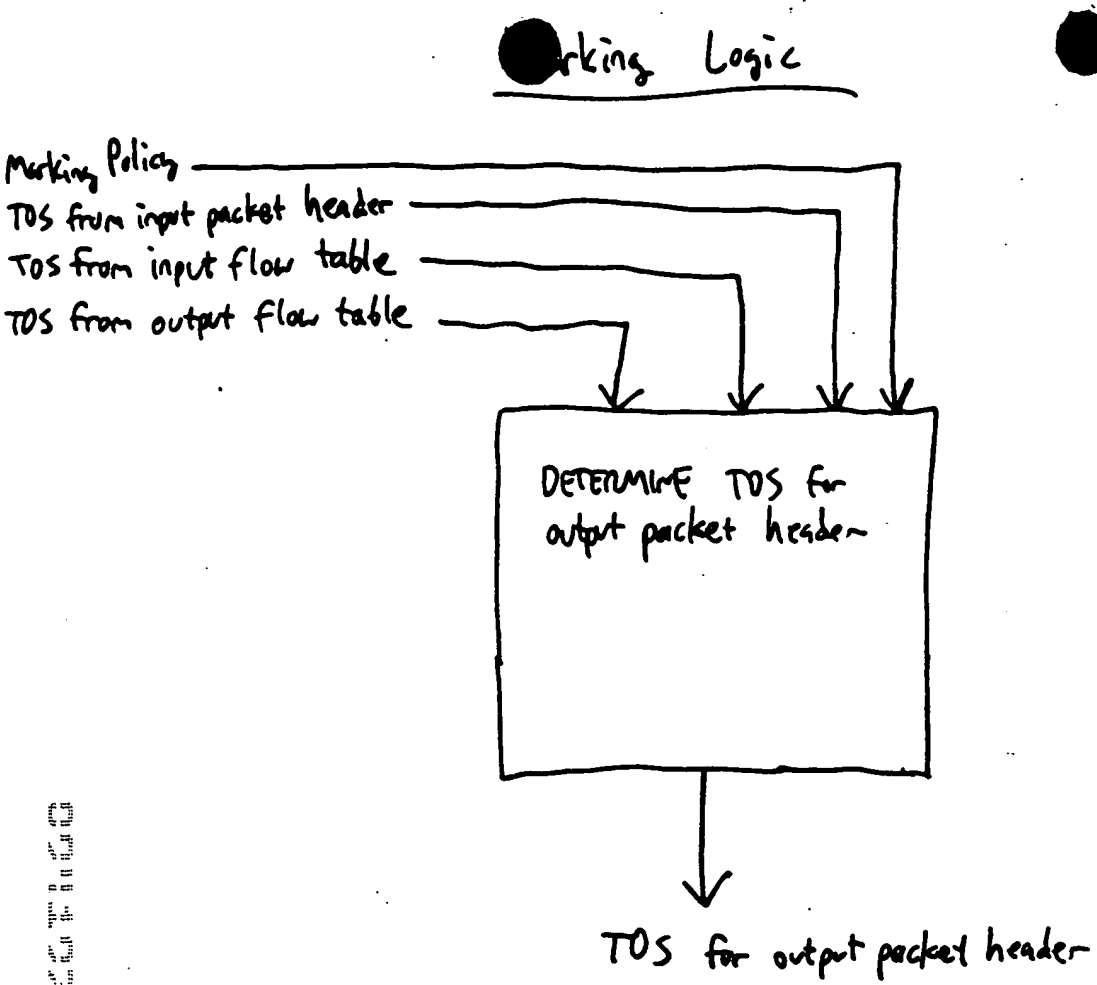

Marking Logic
Marking Policy
TOS from input packet header
TOS from input flow table
TOS from output flow table
DETERMINE TOS for output packet header
TOS for output packet header

FIGURE 17c

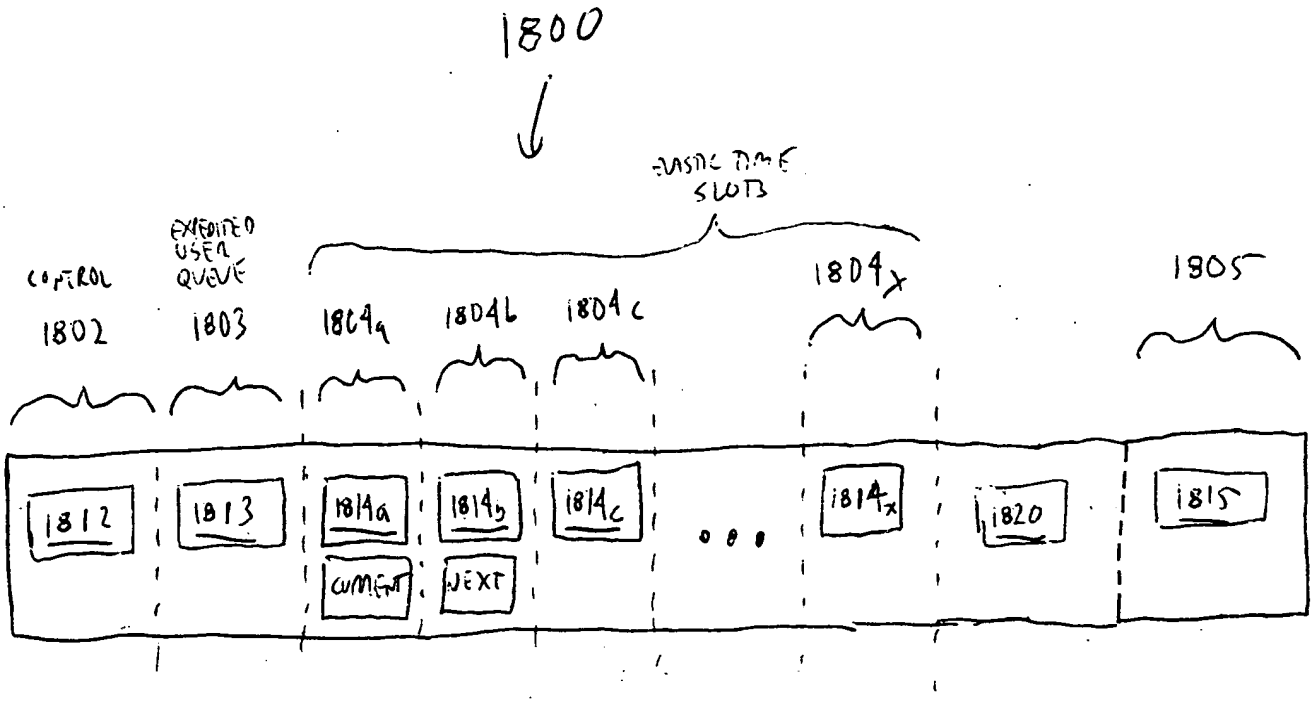

1800
BASIC TIME SLOTS
CONTROL
1802
EXPEDITED USER QUEUE
1803
1804a
1804b
1804c
1804x
1805
1812
1813
1814a
CURRENT
1814b
NEXT
1814c
1814x
1820
1815

FIGURE 18